Project - by - Project Review - Phase I (PBP I) Implementation Guidelines

For Active UIC Projects

March 10, 2016

Overview

Pursuant to the Division's October 2015 Renewal Plan for Oil and Gas Regulation, the Division is committed to a complete review of all previously approved active UIC projects to ensure that oil, gas, and groundwater resources are appropriately protected. Each project will be reviewed and evaluated as if it were a new UIC injection project application. This Project-by-Project Review process will ensure that all project files are up-to-date and contain all project data required under CCR § 1724.7 – 1724.9.

The Project-by-Project review tasks will be completed in two principal phases. Project-by-Project Phase I (PBP I) consists of data collection tasks to be completed by February 15, 2017.

Project-by-Project Phase II (PBP II) will encompass the actual review and analysis of each UIC project file in accordance with all current DOGGR regulations, and is to be completed by March 1, 2018. The PBP II reviews may result in the issuance of new or revised Project Approval Letters (PALS) or project recensions. Additional guidelines and technical support for implementation of PBP II will be forthcoming. The following HQ personnel are available to support the Districts during this undertaking:

Gas Storage Projects:	Phil Gibicar	(916) 322-9770
Southern & Coastal Districts:	Tom Barry	(916) 445-0766
Inland & Northern Districts:	Jerry Salera	(916) 323-1781

PBP I Implementation

The PBP I data collection process will involve the following general steps:

1) Prioritized inventory of active and UIC projects
2) Assess project files for completeness
3) Operator contact, data request and delivery
4) Project progress tracking and database development

A brief summary describing the elements of each step is provided in the following sections.

1. Prioritized inventory of active UIC projects

A current inventory of all active UIC projects for each district has been prepared and is located on the *UIC Project Reviews SharePoint* site (http://docgroupprojects/doc/DOGGR/uic-project-reviews/default.aspx). Each District must assign a specific District UIC staff personnel to each project by March 17, 2016.

The highest priority projects are active Gas Storage projects and active Water Disposal/Gas Disposal projects into zones with total dissolved solids (TDS) less than 10,000 mg/L. Other active water disposal projects should receive priority over active EOR projects. Additional prioritization may be made based on any potential threat to USDWs or ground water quality. A summary table of the active UIC Gas Storage and Water or Gas Disposal projects is shown below.

Number of Active Gas Storage and
Water or Gas Disposal Projects Injecting into <10,000 mg/L TDS Zones
March, 2016

Districts		GS	WD/GD	WD/GD	Total
			No Data, <3K	3K-10K	
Southern		2	1	0	3
Coastal	Ventura	2	1	9	12
	Orcutt	1	6	18	25
Inland	Bakersfield	0	103	71	174
	Coalinga	1	20	5	26
Northern		9	0	0	9
Total		15	131	103	249

2. Assess project files for completeness

PRC § 1724.7 and § 1724.9 specify the statutory data requirements for UIC projects and UIC gas storage projects, respectively. The key elements of the DOGGR *Underground Injection and Disposal Project Data Requirements Approval Memo* checklist have been incorporated into an Excel spreadsheet entitled *PBP I Data Requirements Tracking Memo* (Appendix A and http://docgroupprojects/doc/DOGGR/uic-project-reviews/default.aspx). A copy of this tracking memo will be placed in each project folder on the *UIC Project Reviews SharePoint* site by District UIC staff so that the status of PBP I data collection can be tracked and documented by date. The tracking memo file name will be the project code.

Data, records, and findings from Annual Project Reviews should also be included in each UIC project file. An additional PBP I Excel workbook that also contains worksheets for Annual Project Review data and testing and monitoring requirements has been developed for Gas Storage Projects. A copy of this workbook is available on the *UIC Project Reviews SharePoint* site. This workbook can be modified for use on all UIC projects, and is a DOGGR acceptable tool to be retained for two years by District UIC Staff.

Below are further details of the Project Data Requirements that UIC staff should consider when reviewing project files for completeness:

PRC §1724.7(a)(1) – Statement of primary purpose of the project.

The statement of purpose must clearly identify the type of UIC project and list the injection wells and zones. If the injections wells or zones have changed since the project was approved, then there must be clear documentation of the current project conditions.

PRC §1724.7(a)(2) - Reservoir characteristics of each injection zone...
This section requires several items including porosity, permeability, average thickness, areal extent, fracture gradient, original and present temperature and pressure, and original and residual oil, gas, and water saturations of each injection zone. This list of data should be as complete as possible. However, applicable and necessary data will vary on depending on the type of UIC project.

PRC §1724.7(a)(3) – Reservoir fluid data for each injection zone...
The Division has implemented new standardized water sampling protocols and analyses of injection and formation waters (Appendix B). Hence, for projects submitted after May 18, 2015, water samples must conform to the Division revised sampling protocols and analyses (Notice to Operators – May 18, 2015 [Amended June 8, 2015]).

For projects submitted before May 18, 2015, properly labeled and identified laboratory analyses identifying TDS in mg/L (derived from EPA method 160.1 or equivalent) of "native" injection zone water are desired. However, this information may not exist, and it may not be possible to collect a new "native" sample from injection zones. In these cases, it may be necessary to rely upon TDS calculations from electric logs, TDS estimates from historic salinity analysis, or correlation from adjacent zones. All TDS data must be qualified by well ID, zone depth, date, and method of analysis or calculation.

PRC §1724.7(a)(4) – Casing diagrams...
Casing diagrams for all wells penetrating the injection zone within the AOR must be submitted. This includes any wells that have been installed, re-worked, or abandoned since the project was originally approved. This also includes all wells within a new or modified AOR if additional injection wells or zones have been added.

The quality, clarity, completeness, and accuracy of casing diagrams are often insufficient for UIC project approval. Reviewers should determine not only if casing diagrams within an AOR have been submitted, but if the existing casing diagrams meet basic minimum requirements. The Division's recommendations for casing diagrams (Appendix C) should be consulted when evaluating the quality of casing diagrams, and a copy should be provided to operators whenever casing diagrams are requested. Actual cement volumes should be documented on the casing diagrams.

Note that an objective of PBP I is to ensure that properly prepared and legible diagrams for all necessary AOR wells are on file. Actual review of diagrams for detail and content accuracy will be accomplished during PBP II.

PRC §1724.7(b)(1) – Structural contour map... & PRC §1724.7(a)(4) – Isopach map...

All maps should be clearly labeled as to what is mapped, scale, contour interval, or other information the map is intended to convey. Well locations and geologic structures must be accurately plotted.

A structural contour map drawn on a geologic marker at or near the top of each injection zone and an isopach map of each injection zone or subzone must be included in the project file. If the injection zone has changed since the project was approved, new structural contour and isopach maps must be submitted.

PRC §1724.7(b)(3) – Geologic cross section...
Cross sections through the project should be clearly labeled and of such scale that the overlying confining stratigraphy and lateral geologic confinement (if any) are clearly presented. At least one geologic cross section must be through at least one injection well in the project area. Stratigraphic cross sections that only show correlated well logs are not sufficient. Faults and other geologic structures must be shown on scaled cross sections. Operators may choose to submit both stratigraphic cross sections and structural geologic cross sections. Clear identification of the injection zone(s) and existing or proposed injection perforations should be shown.

Reviewers should also check to see that all formation and injection zone nomenclature conform or are clearly defined in stratigraphic correlation with those used in the Division's "Data Sheets" (Publications TR10-TR12).

PRC §1724.7(b)(4) – Representative electric log...
Type electric logs should display the entire section to a depth below the deepest producing zone. A simple image clip of the injection interval is not sufficient. All uphole and downhole geologic units, formations, freshwater aquifers, and oil and gas zones should be clearly identified and agree with any tops or zone picks utilized in the structural contour map, isopach map, or cross sections. If a cross section electric log is of sufficient scale and provides the requisite information, a stand-alone type electric log is not necessary.

3. Operator contact, data request and delivery
Once all Project Data Requirements that are missing from a project file are identified, a letter will be sent to the operator specifying what data is required and why. In order to expedite this process and encourage consistency among districts, a sample letter format has been prepared (Appendix D). The letter must provide specific deadlines by which an operator has to provide the requested data. Deadlines should be determined by the type of data required and a reasonable estimate of how long it may take an operator to create or obtain the data.

Operators will submit data in digital formats (when possible) to expedite population of the Division's current and future databases. A data dictionary for has been developed and is located on the *UIC Project Reviews SharePoint* site (http://docgroupprojects/doc/DOGGR/uic-project-reviews/default.aspx).

4. Project progress tracking and database development

The *UIC Project Reviews SharePoint* site (http://docgroupprojects/doc/DOGGR/uic-project-reviews/default.aspx) has been set up for PBP I progress tracking and data collection. Data will ultimately be incorporated into the Division's Risked Base Data Management System (RDBMS) which is currently under design.

As discussed in the above sections, the *UIC Project Reviews SharePoint* site presently contains a project inventory spreadsheet for tracking PBP I reviews of all active UIC projects, and data requirements tracking memos are to be completed and saved to the SharePoint site to document the data collection status of each active UIC project.

The Division will provide guidance updates regarding desired and/or acceptable digital submission formats as this Project-by-Project Review process moves forward and the RDBMS is developed.

APPENDIX A

PBP I DATA REQUIREMENTS TRACKING MEMO

Project Code:		List of Injection Wells	
Project Name:		API #	Well Name
Project Type:			
Operator:			
Field Name:			
Area:			
Injection Zone(s):			
			(additional wells rows can be inserted here)
All Data in File (dd/mm/yr)	Missing Data Requested (dd/mm/yr)	All Data Received (dd/mm/yr)	(N/A may be entered in columns if data are not applicable to a specific projects)
Engineering Study:			
			Statement of primary purpose of the project.
			Reservoir characteristics of each injection zone, such as porosity, permeability, average thickness, areal extent, fracture gradient, original and present temperature and pressure, and original and residual oil, gas, and water saturations.
			Reservoir fluid data for each injection zone, such as oil gravity and viscosity, water quality, and specific gravity of gas.
			Casing diagrams, include cement plugs, and actual or calculated cement fill behind casing, of all idle, abandoned, or deeper-zone producing wells within the area affected by the project, and evidence that abandoned wells in the area will not have an adverse effect on the project or cause damage to life, health, property, or natural resources.
			The planned well-drilling and abandonment program to complete the project, including a flood-pattern map showing all injection, and abandoned wells, and unit boundaries.
Geologic Study:			
			Structural contour map drawn on a geologic marker at or near the top of each injection zone in the project area.
			Isopachous map of each injection zone or subzone in the project area.
			At least one geologic cross section through at least one injection well in the project area.
			Representative electric log to a depth below the deepest producing zone (if not already shown on the cross section), identifying all geologic units, formations, freshwater aquifers, and oil and gas zones.
Injection Plan:			
			A map showing injection facilities.
			Maximum anticipated surface injection pressure (pump pressure) and daily rate of injection, by well.
			Monitoring system or method to be utilized to ensure that no damage is occurring and that the injection fluid is confined to the intended zone or zones of injection.
			Method of injection.
			List of proposed cathodic protection measures for plant, lines, and wells, if such measures are warranted.
			Treatment of water injected.
			Source and analysis of the injection liquid.
			Location and depth of each water-source well that will be used in conjunction with the project.
			Copies of letters of notification sent to offset operators.
			Other data as required for large, unusual, or hazardous projects, for unusual or complex structures, or for critical wells. (Examples of such data are: isogor maps, water-oil ratio maps, isobar maps, equipment diagrams, and safety programs.)
Gas Storage Projects:			
			Characteristics of the cap rock, such as areal extent, average thickness, and threshold pressure.
			Oil and gas reserves of storage zones prior to start of injection, including calculations.
			List of proposed surface and subsurface safety devices, test, and precautions to be taken to ensure safety to the project.
			Proposed waste water disposal method.

The data submitted as part of the UIC project has been initially reviewed, and the project file contains all required data.		
	Date (dd/mm/yy)	*Name*
UIC Engineer:		
District Deputy:		

APPENDIX B

WATER SAMPLING PROTOCOLS AND ANALYSES OF INJECTION AND FORMATION WATERS

DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, & GEOTHERMAL RESOURCES
801 K STREET • MS 18-05 • SACRAMENTO, CALIFORNIA 95814
PHONE 916 / 445-9686 • FAX 916 / 323-0424 • TDD 916 / 324-2555 • WEB SITE conservation.ca.gov

May 18, 2015
Amended June 8, 2015

NOTICE TO OPERATORS

WATER SAMPLING PROTOCOLS AND ANALYSES OF INJECTION AND FORMATION WATERS

The Department of Conservation, Division of Oil, Gas, & Geothermal Resources (Division) requires all oil and gas operators who are actively injecting water into the subsurface to conduct water sampling and analyses of their injection water and each receiving formation water. As per direction from the State Water Resources Control Board (SWRCB), Oil and Gas Monitoring Unit, the sampling procedures shall be consistent, where applicable, with the United States Environmental Protection Agency (US EPA) Groundwater Sampling Guidelines for Superfund and Resource Conservation and Recovery Act (RCRA) Project Managers (May 2002), www.epa.gov/superfund/remedytech/tsp/download/gw_sampling_guide.pdf and/or the US EPA Science and Ecosystem Support Division Operating Procedure for Groundwater Sampling (March 2013) www.epa.gov/region04/sesd/fbqstp/Groundwater-Sampling.pdf. For the purpose of this notice, if these EPA guides have been updated, the most recent document will be applicable.

The Division requires that all sources of injection water be identified and a chemical analysis of the injection water and each receiving formation water in the area of the injection project be performed with the results submitted to the Division prior to injection, whenever the source of the injection water is changed, **or as requested by this office**.

These guidelines and procedures for sampling the injection and formation waters apply to the operators who must collect samples pursuant to Division's injection project requirements. The purpose of these guidelines is to ensure that all personnel involved with water sampling utilize procedures to obtain data that are technically valid, scientifically defensible, and of proven effectiveness.

Sample Collection

Operators collecting samples for compliance with Division requirements must follow an acceptable sampling and testing protocol (as summarized here and in the referenced EPA documents stated above). Samples must be collected by personnel who are trained in the proper collection and preservation of injection and/or formation water samples. Personal protective equipment (PPE) and calibrated monitoring equipment must be used during the sampling activities.

Before collecting injection and formation water samples, a field sample shall be collected and monitored for the following parameters using a calibrated field meter:

1. Total Dissolved Solids (TDS) (estimated)
2. Turbidity (NTUs)

3. Temperature (°C)
4. Conductivity (umhos/cm)
5. pH (Units)

The information from the field meter readings shall be recorded on a daily field report and provided to the laboratory analyzing the samples. A copy of the daily field report shall also be provided to the Division and shall include, but is not limited to, the following information:

1. Date and time the samples were collected
2. Name of the person and company collecting the samples
3. Where the samples were collected from (pipe or tank designation)
4. Pipe or tank size where samples were collected (if applicable)
5. Flow rates and pressures of pipe where samples were collected (if applicable)
6. Well IDs with API Numbers associated with the water.

When collecting waters, clean disposable gloves should be worn. Vehicle engines and any other equipment with exhaust systems should be either turned off or, if not possible or safe to do so, the sampler should try and collect the samples upwind from any potential exhaust. Any exhaust system operating nearby during the sampling activities should be noted. Smoking should not be allowed by any personnel near the sampling activities. All equipment used during the sampling activities should be cleaned and calibrated according to the manufacturer's recommendations. Any re-usable equipment or sampling tools need to be decontaminated using a non-phosphorus soapy water mix followed by two separate distilled water rinses. Decontamination procedures should also be summarized in the report.

Appropriate bottles, such as glass or polyethylene, must be used for the type of water sampled and water analysis requested. Necessary preservatives and preservation techniques must be used to stabilize the water constituents and appropriate field measurements (i.e., TDS [estimated], temperature, turbidity, pH, and conductivity) must be taken so that the laboratory can be provided with important information on the physical state of the water at the time of sampling. Sample containers with proper preservatives should be provided by the laboratory. All samples need to be labeled, recorded on a chain-of-custody document, and immediately placed in a cooler with enough ice (or blue ice) to maintain a six (6) degree Celsius (or less) temperature until delivery (preferably on the same day) to a state-certified laboratory. The cooler should be periodically checked for ice and drained of any water. If the samples can't be delivered to the laboratory on the day the samples were collected, a signed and dated custody seal should be placed across the cooler lid in order to maintain sample security overnight.

The samples must remain chilled and with the initial sampler until the samples are delivered to the laboratory. If the initial sampler can't deliver the samples to the laboratory, the initial sampler must sign the chain-of-custody document over to the individual who is assigned the responsibility of delivering the samples to the laboratory. If the chain-of-custody document is not completed accurately or if there are gaps of time where the sample location can't be verified, the accuracy of the results will be questionable. Once the samples are delivered, a laboratory technician will check and sign the chain-of-custody document, check the sample containers, and check the temperature of the samples. This information will be presented in the final laboratory report.

Sample Labels and Chain-of-Custody Documentation

Every sample container needs to have a sample label with pertinent information completed at the time of sample collection. Sample labels need to have, at a minimum, the following information:

1. Facility and Operator Name
2. Sample ID
3. Date and Time of Sample Collection
4. Analysis Requested
5. Preservatives

An accurate written chain-of-custody record must be kept to trace the possession of the samples from the moment of its collection until the time of analysis. A chain-of-custody record provides assurance of the sample's origin and the timeliness of the submittal to the State-certified laboratory. Also, the sample bottles should be labeled (with waterproof ink) to indicate pertinent information about the samples, and the laboratories performing the analyses must use EPA-accepted analytical methodologies. The chain-of-custody form should be obtained from the laboratory along with the sample containers, sample labels, and preservatives (except the ice). The chain-of-custody form should have, at a minimum, the following:

1. Facility and Operator Name, Address and Phone Number
2. Laboratory Name
3. Sample ID
4. Date and Time of Sample Collection
5. Sample Matrix (water)
6. Number of Sample Containers
7. Analysis Requested
8. Sample Preservatives
9. Sample Container volumes and types
10. Sampler's name
11. Requested Turnaround Time
12. Signature line with date and time for relinquishing and receiving the samples.

Sample Shipment

If samples need to be shipped to another location, the sampler must follow all shipping guidelines, including but not limited to:

1. Securing the samples for transport (ex. bubble wrap)
2. Maintaining a six (6) degrees Celsius (or less) temperature within the cooler
3. Sealing all possible areas where leaks could occur during transport (ex. drain spouts and lids)

Placing the sampler signed chain-of-custody form in a sealable bag and taping it to the underside of the cooler lid before sealing the lid

Placing any required labels on the cooler, including the bill of lading with addresses and contact phone numbers).

Refer to the transporter's and laboratory's requirements for shipping liquid sample containers.

Analytical Methods

All injection wells and injection waters must conform to criteria for Class II well operations under the U.S. Safe Drinking Water Act. In order to conform to criteria under the U.S. Safe Drinking Water Act, the Division as well as the State Water Board requires that the water be sampled under strict quality assurance/quality control (QA/QC) sampling procedures and the samples be analyzed by a laboratory that is certified by the California Department of Public Health environmental laboratory accreditation program (ELAP), under proper chain-of-custody protocol, for the following analyses:

Analyses	EPA Method	Holding Time	Preservative	Sample Container
TDS	160.1	7 days	≤6°C	One liter plastic
CCR Title 22 Metals, Major and Minor Cations, and Trace Metals*	200.7/200.8	180 days	HNO_3	500 ml plastic
BTEX	8021	14 days	≤6°C, HCL, No HS	Three-40 ml VOA-glass vials
TPH for Crude Oil	8015(M) C_{10}-C_{44}	7 days	≤6°C	One liter amber glass
PAHs**	8310	7 days	≤6°C	One liter amber glass
Methane	RSK-175(M)	14 days	≤6°C, No HS	Two-40 ml VOA-glass vials
Radionuclides***	900.0 series	180 days	Varied #	Varied #
Alkalinity	310.2	14 days	≤6°C	500 ml plastic
Chloride	300	28 days	≤6°C	500 ml plastic
Nitrate	353.2	48 hours	≤6°C	500 ml plastic
Sulfate	300	28 days	≤6°C	500 ml plastic
Bromide	300	28 days	≤6°C	500 ml plastic

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
M = Modified
HCL = Hydrochloric Acid dilution (prepared and provided by laboratory)
HS = Head Space
ml = milliliter
PAH = Polynuclear Aromatic Hydrocarbons
TDS = Total Dissolved Solids
TPH = Total Petroleum Hydrocarbons
VOA = Volatile Organic Analysis
#confirm preservative and container requirements with laboratory conducting the analysis

Note: Specific detection limits for each compound are listed in the specific EPA-approved method. However, high concentrations of a compound may require the laboratory to dilute the sample with a known dilution factor in order to obtain viable results. These dilution factors must be recorded in the laboratory report as a qualifier and discussed by the laboratory. If the dilution factors are determined to be beyond acceptable levels, additional testing may be required.

*Title 22 Metals, major and minor cations, and trace metals shall include, but are not limited to, the following constituents:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Vanadium, Zinc.

**Polynuclear Aromatic Hydrocarbons (PAHs) shall include, but are not limited to, the following compounds:

Acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.

***Radionuclides shall include, but are not limited to, the following constituents:

Gross alpha particle activity, Gross beta particle activity, Radium-226, Radium-228, Strontium-90, Tritium, and Uranium.

Reporting

The water quality information shall be submitted in a technical report which includes, at a minimum, the following:

1. A site plan indicating the sample location.

2. A description of field sampling procedures (ex. who conducted the sampling, when and where the samples were collected, how the samples were collected and preserved, and when and where the samples were delivered for testing).

3. Organized tables of field readings and analytical results. Analytical tables should include current State drinking water standards for comparison. Example of tables are as follows:

    a. Field data table
    b. Metals table
    c. PAH table
    d. TPH, Methane and BTEX table

e. Cation, Anion and TDS table.

4. A Stiff diagram plotting cation verses anion concentrations (calculated to milliequivalents per liter).

5. Quality control qualifiers and a summary of findings should be discussed.

6. A discussion of any waste management and disposal procedures.

7. Copies of the analytical results, including QA/QC procedures, analytical test methods, and signed chain-of-custody forms should be included as an appendix to the report.

In addition to Division reporting requirements, the operator shall submit all water quality data and groundwater monitoring reports to the SWRCB in an electronic format that follows the guidelines detailed in the California Code of Regulation, title 23, division 3, chapter 30 (commencing with section 3890), and upload data as required to the SWRCB's GeoTracker information system.

In order to have the opportunity to witness the injection or formation water sampling activities, please notify the Division of the schedule in advance (at least 24 hours) of any sampling activities. Please schedule any sampling activities during normal business hours, Monday through Friday.

APPENDIX C

CASING DIAGRAM INFORMATION

For casing diagrams to be effectively evaluated, they should have the following information, represented graphically where possible:

1. Well information: operator, well lease name, well number, and API number.
2. Casing sizes & weights, and depths of shoes, stubs and/or liner tops.
3. Depths of perforation intervals, water shut off holes, cement ports, cavity shots, cuts, casing damage, and top of junk/fish left in well.
4. Hole sizes & depths.
5. Cement plugs inside casings (top and bottom of cement plug, indicate actual or calculated).
6. Cement fill behind casings (top and bottom of cement fill, indicate actual or calculated).
7. Type and weight (density) of fluid between cement plugs.
8. Depths and names of formation/zone tops/sand markers penetrated by the well, **especially the top and bottom of the intended zone of injection**.
9. Base of Freshwater (BFW) depth.
10. The above information should be included in the present well bore and **all previous redrilled/sidetracked well bores**.
11. Initials and date of last person to update casing diagram.

Note: All information on casing diagrams should be legible and easy to read. Please see the diagram below as an example.

EXAMPLE CASING DIAGRAM

Oldtimer Oil Co.
'Gusher' 3
API #059-00002

ELEVATION: 191.02' D.F.

DATUM: 9.5' above concrete mat

TD: 2636'

BFW: 900' +

COMPLETION DATE: 4/01/1955

DIRECTIONALLY DRILLED: Yes

JUNK: none

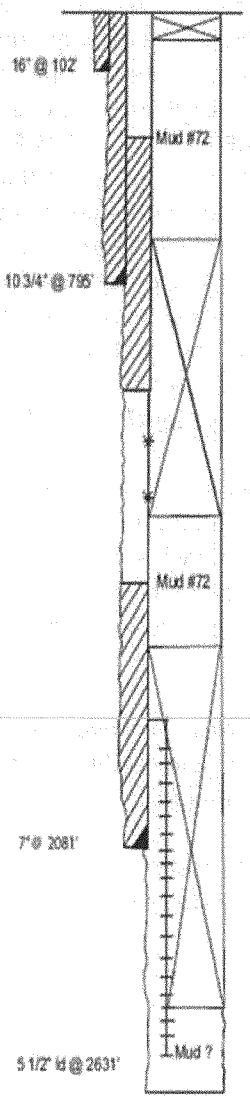
PLUGS: 0' - 35' (w 7 sx Class G)
745' - 1240' (w 95 sx Class G)
1680' - 2500' (w 93 sx Class G, 3% Bentonite)

CASING: 16" CMTD @ 102' (w 7 sx) ETOC?
10 3/4", 40.5#, CMTD @ 795', (314 sx, Cls G, 3%) ETOC 0'
7", 23#, CMTD @ 2081' (355 sx, Cls G, 3%CaCl) ETOC 1375'
c.p. @ 1005' (207 sx Cls G) ETOC 365'
damage @ 1151'
hole @ 1230'
wso @ 1849'
5 1/2", 15# ld @ 1940' - 2631'
Perfs: 1952' - 2622'
Collasped @ 2502'

HOLE SZ: 2, 0 - 102'
14 3/4" 102' - 795'
12 1/4" 795' - 2085'
9 7/8" 2085' - 2636'

MARKERS: Top of Zone Markers
A - 1950' - Pilocene
B - 2375 - Miocene

Shale @ 1640', 2132' - 2375', 2635'



BFW: 900' ±

Shale 1950'

Oil Zone A

2132'

Shale 2375'

Oil Zone B

Shale 2635'

rl 3/4/2011

APPENDIX D

December 1, 2015

Mr. XXX XXXXXXX
XXXXXXXXX Oil and Gas Co.
Bakersfield CA 93309

Under delegation of primacy by the U.S. EPA for Underground Injection Control (UIC) projects within the State of California, the California Division of Oil, Gas, and Geothermal Resources (Division) is responsible for approving and overseeing all Class II injection operations. As part of this responsibility, it is the Division's policy to annually review all UIC projects to ensure that all projects are complete in respect to required project documents (14 CCR § 1724.7 – 1724.8), comply with all approved project requirements as specified in a Project's Approval Letter (PAL), and that all project files are current in respect to any project modifications/additions that may have taken place since original project approval.
Under the Division's October, 2015 Renewal Plan for Oil and Gas Regulation, the Division is committed to a complete review of every active and idle UIC project is has approved to determine if the project files contain all required documentation, mechanical integrity testing is up-to-date, and that all projects reflect appropriate protection of groundwater resources. A copy of the Division's Renewal Plan and estimated completion dates may be obtained at ftp://ftp.consrv.ca.gov/pub/oil/Publications/Renewal%20Plan%2010-08-2015.pdf.

In accordance with these objectives, a review of the project files associated with the following projects has identified some incomplete or missing information that must be submitted before the Division can consider the project file complete. Attached is a summation, by project, of the information that must be provided to the Division. Please provide this information within 120 days of receipt of this notice in order for us to complete our project review in a timely manner and prevent any undue delays or compliance issues.

Please be advised that Division policies may have changed since a project's original approval. Attached please find guidance documents providing additional information regarding current water quality sampling and casing diagram requirements.

Thanks you for your attention to this matter. If you feel that we have overlooked something in our files, or would like to further discuss this issue, please feel free to call (district contact).

Sincerely,

Enclosures